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ABSTRACT

This document briefly critiques some of the basic theories upon which art education studies are often based, summarizes the research generalizations that may be made at this time, and reviews pertinent experiments that hold promise for future research. The Haptic-Visual Theory of Perceptual Development (Lowenfeld, 1957), the Differentiation Theory of Perceptual Development (Arnheim, 1964), the Perception-Delineation Theory (McFee, 1970), and Gibson's perceptual psychology viewpoint of perceptual learning and development (1969) are examined to determine whether (1) they point out what is learned and (2) they elaborate the principles for learning. It is concluded that the more useable theoretical constructs are found in the field of perceptual psychology, and, in addition, that three general criticisms of perceptual development theory can be made: (1) the existence of prior capabilities is slighted or ignored in most of these theoretical descriptions; (2) the assessment of primary capabilities that may play a sequential role in subsequent learning is largely ignored; and (3) the presence of a performance does not make it possible to conclude that learning has occurred; for this a change in performance is necessary. Learning variables relevant for experimental study are identified as: (1) assessment of what capabilities play a part in determining subsequent learning; (2) evaluation of the initial capabilities of the learner; and (3) determining the stimulus conditions for learning existing outside the learner. (MJB)

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ART EDUCATION AND PERCEPTUAL THEORY: A CRITICAL ANALYSIS

Rex E. Dorethy

Historically in art education, most interest and consequent research in perceptual learning has stemmed from the early work of Lowenfeld (1957), the reasoning of Arnheim (1964), and the research synthesizing efforts of McFee (1970). Some advances in our accumulated viewpoint have accrued through these and subsequent studies from the standpoint of stimulated interest and classroom practice. The uncoordinated direction and theoretical dilemmas created by much of this investigation has, however, left substantial gaps in our knowledge concerning visual perception and its relation to the art learning process. Due in part to the propensity of researchers within a discipline to recreate the theoretical positions of their mentors, and also to depend heavily upon partial viewpoints popularized from other disciplines, much recent work in art education studies has held to the same limited theoretical bases. Confouding the problem has been the development of a significant new body of research by experimental psychologists concerning factors which seem to affect the development of perceptual learning. Much of this data has been ignored.

The purpose of this integrated review of perceptual learning is to briefly critique some of the basic theories upon which art education studies are often based, to summarize the research generalizations which may be made at this time, and to review pertinent experiments which hold promise for research in our field.

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While each of the foregoing theorists has developed useful concepts of perceptual development in art, each position suffers important limitations. Each theory shares certain limitations, and each contains unique problems when used as a basis for research or learning. Nonetheless, the overall effect and contribution of this body of work to art education philosophy cannot be underestimated.

In research and in education, theory is meant to be a useful and reasonable guide to action. Good teaching is often held to derive from good theory. Theory usually begins with a set of plausible ideas which describe empirical situations and also tends to be subject to refutation or verification by empirical testing. In their best form, theories are systematically built, tested for internal consistency, clarified in terms of critical variables and controlled for extraneous influences. The theorist also continually seeks and tests for relations among phenomena. Most useful research studies begin with a theoretical basis and proceed through logical deduction and hypothesis development to rigorous testing of the original theoretical belief. In theory building, metaphysical explanations, those which cannot be tested, are ruled out. Theory which cannot be tested is of limited value and may not be theory at all. Theories which survive the rigors of testing tend to be powerful as well as useful (Kerlinger, 1964).

For classroom practice, satisfactory learning theory requires at least two levels of elaboration. First, such theories need to point out what is learned, and secondly, usable theories tend to elaborate the principles for learning. If complex learning is to be obtained, ordering the learning principles from simple to complex may be required. Key points and operational definitions implicit in the theory need explication, and

rigorous, systematic experimental studies which isolate causal factors will be needed for verification purposes.

The haptic-visual theory (Lowenfeld), the whole-to-parts differentiation (Arnheim), and the perception-delineation theory (McFee), are all inferred explanatory processes. The productive mechanism for each was inductive logic. Each tends to go beyond information given and each requires verification. What is learned, hence teachable, is largely ignored. Consequently, perceptual learning theory in art has received more attention by way of explanation about what is or what occurs, than by way of description of how learning occurs or what is learned in perceptual learning. Since content centers on what can be learned, if teaching is to occur learning theory must delineate salient aspects of the learning process.

Given this viewpoint of learning theory, individual examination of several theories of perceptual learning or development will be useful.

The Lowenfeld Haptic-Visual Theory of Perceptual Development

Lowenfeld's viewpoint is the oldest of those reviewed, and encompasses personality development in the form of self concept, mental health and creativity (Lowenfeld, 1957). Perceptual development is seen as a pervading influence in the theoretical framework of these factors.

Gestalt psychology, the notions of John Dewey, child developmentalists and certain positions of the Progressive Education movement form much of the value basis for Lowenfeld's work. In this instance, perceptual development is seen as inherent with the child, and adult influence

may stifle the child's impulses. Lowenfeld emphasized sensory experience as the primary means of perceptual development, and saw the teacher's task as that of arranging conditions so the whole potential of the child could develop. Hence, the emphasis was on allowing perception to develop, a somewhat passive role for instruction.

The basis for much of Lowenfeld's viewpoint concerning perceptual performance stems from his haptic-visual investigations (the term investigation is used advisedly here since the so-called experiments were actually ex post facto investigations). The difference between investigation and experimentation is control. Cronbach offers the notion that an experimenter is a puppeteer, while an investigator merely observes a play where Nature pulls a thousand strings (1957). With Lowenfeld, the visually oriented subject is said to respond to the perceived array by recording the objective qualities of stimuli, depending mainly upon vision. Visual subjects tend to produce art which is representational and lacking in physiogonomic or kinesthetic quality. The haptic, conversely, approaches space with an orientation that is kinesthetic and emotional. Touch, rather than vision may be important. Haptic subjects tend to portray their feelings rather than visual aspects of the environment.

With regard to children's spatial development in art, a basic aspect of Lowenfeld's position is a somewhat rigid hierarchy of developmental stages. These stages are systematic and unfold maturationally as though genetically controlled, an argument stemming from the German psychologists. Lowenfeld's work in this area is filled with admonitions for which little experimental evidence exists. He states for instance, that (1) "the

first origin of the base line is the kinesthetic experience of moving along a line," (2) catalogs age 7-9 as "the first definite space concept: 'base line'," (3) and argues that posing analytic art problems for children restricts their freedom of expression (1957, pp. 142-171). These (and other) assertions concerning children's spatial abilities have developed inductively at points, and have been fixed a priori as truth in the methodology of art education largely by attendance to tenacity and authority. The self-corrective methods of scientific thought are often missing in this argument. Later research suggests contrary findings. For instance, 60 per cent of the four-year-olds in one study were base line users (Dorethy, 1965). Similarly, Gibson, among others, suggests transitions in perceptual development rather than the abrupt changes in behavior implied by categorical stages (1969).

To verify his beliefs, Lowenfeld devised a series of five tests which were claimed to measure the tendency of a subject to orient himself to one or the other of these genetically based polar styles of perceiving (1945). The tasks deal with work responses and form recognition, with art having little emphasis. The tests indicated that about 70 per cent of the population orient themselves haptically or visually. Classification of the remainder was indefinite, raising questions of variability. While the tests are interesting, their validity, reliability and generalizing power is open to question. Published information relating to the test construction techniques is meager, making criticism or acceptance difficult. These tasks do not have the benefit of correlational data, nor do the procedures lend themselves to replication (in one instance, "air force cadets" are the sample, but no other distinctions are made). Statistical analysis in these investigations is minimal, and one may question the validity of data developed where chance factors are not

recognized. Additionally, the variables which may account for haptic or visual perception are never controlled for, and so the art teacher cannot be sure that these characteristics are inherent. Controlled experiments would be a valuable addition to the haptic-visual notion for these reasons. Lowenfeld felt that his tests "proved" haptic-visual tendencies. Contemporary psychologists would be more cautious.

The haptic-visual position has enjoyed wide appeal as a philosophic basis for art education. Its worthiness as a usuable perceptual theory, however, is questionable since theory demands further experimentation and verification. Much of Lowenfeld's writing shows a metaphysical bent (it cannot be tested by present means) and its use in learning situations is therefore questionable. Extending teaching from an already tenuous base invites further difficulties. Observation served as the basis for many inferences contained in the viewpoint and bias may be a factor. What is learned perceptually tends to be lost to the rigid criteria of developmental stages and haptic-visual orientation. The mechanics of perceptual development are not made clear and the requirement of non-interference seems to severely limit the teacher's role in children's learning. Contemporary perceptual psychology studies enjoy tighter control and verification; and investigators into sensory experience, learned differentiation and practiced perceiving suggest a more dynamic role for the educator (Held and Richards, 1972). Recent studies in art education also propose an important role in accelerating perceptual abilities (Salome, 1965; Rennels, 1969; Dorethy, 1973), and suggest that concepts such as distinctive features, motion, time and space can be contributing variables for learned modification in artistic functioning. The implication is that perception can be learned and restriction of individual development is not an insuperable problem.

The Arnheim Differentiation Theory of Perceptual Development

Arnheim's theory of perceptual development is strongly Gestalt based in that the processes of perception are held to be given at birth and proceed maturationally towards increased differentiation (Arnheim, 1964). Perceptual development is inherent in the organism and not dependent upon environmental stimulation. Differentiation may be viewed as ability to segregate and isolate visually pertinent data. Perception is thought to proceed from perceiving of gross wholes towards finer distinction of the parts making up the whole. Simplified children's drawings are held to be a product of limited perceptual ability and not merely a lack of motor skill. Children draw what they see, and they see less than an adult.

Much of Arnheim's writing is directed as an attack on the Intellectualist position that children draw what they know. Little attempt is made to attend to the influences of cognition or learned modification of perceptual data, and cultural or environmental influences are largely denied. This distinction is not surprising when one realizes that some of the early Gestalt writing was directed at overcoming the Empiricist's viewpoint of learned abilities (Koffka, 1935). Conversely, modern psychology abounds with experimental studies which tend to refute or render suspect the rigid Nativist tradition of Gestalt psychology, although inherent capacities for perception are not disregarded (Noton and Stark, 1972). Perception is presently thought to be learned, for the most part. Of basic interest to education is the notion that what is learned can probably be taught.

The notion of maturational development with Arnheim is somewhat contradictory since he holds that each stage of perceptual development is

dependent upon successive stages. He admits, however, that children may skip or linger with stages of drawing development. Since theory, in this case, is derived mostly from ex post facto examination of drawings, causal factors concerning individual differences in art remain open to question. The potential for improving art work is also neglected since Arnheim feels that instruction is inappropriate. What is developed (learned?) is differentiation. Increasing analysis of visual structure is what is differentiated, but the means of analyzing visual structure are not delineated. The mechanism by which learning might enhance differentiation is therefore not elaborated.

Arnheim's theory is logically consistent, although its inductive qualities tend to go beyond the information given by ignoring some obvious problems. Arnheim is also one of a few perceptual theorists to address himself to the problems children encounter in rendering a three-dimensional world on two-dimensional surfaces in art. The notions inherent in this theory, however, are not experimentally grounded nor are they tested, except through observation, a process greatly subject to the observer's bias. Arnheim's theory is an interesting concept of children's perceptual development in art, albeit a problematic one.

The McFee Perception-Delineation Theory (P-D-T)

McFee also views perceptual development as a primary element related to the art experiences of children (McFee, 1970). The perception-delineation theory is a broad-based explication of many factors thought to be determinants in the development of art behavior.

Six interacting points are cited as explanatory of what takes place:

1. Readiness
2. Psycho-cultural transactions
3. Visual-physical environment
4. Information handling
5. Creative delineation
6. Evaluation of feedback and transfer

Point One refers to the overall cognitive readiness of the child to respond perceptually and conceptually. Point Two concerns held values, prior attitudes, and new information presented in the classroom; in brief the psycho-cultural transaction of the child and his environment. The teacher may manipulate these variables to foster more learning. The third point refers to art, man-made and natural things from the complex of the visual-physical environment. Included are the affective, structural and symbolic qualities of the visual arts, as well as past experiences from the environment. Point Four is concerned with the child's overall habits of information handling. The teacher's place is to assist in the integration of new information handling. Increased percepts and concepts should result, and the expanded capacity is felt to allow more alternatives for creative problem solving and art sensitivity. Creative delineation, Point Five, concerns symbol usage for communication of perceptual and conceptual responses to experiences by designed expression. In short, the making of art. If the response is to existing forms, delineation may involve analysis and abstraction of the message or the affective qualities, with the structure of the message conveyed ideationally about the work of art. Point Six refers to the feedback information the learner gets from his own responses, and may contain information that alters readiness and ability to transfer learning to succeeding tasks.

McFee argues that learning is seldom an isolated event, and emphasizes that certain theory points are interacting. The ordering of the system is aimed at teaching concerns and not at age based maturational development. McFee recognizes the existance of developmental occurrances, but suggests great overlap and flexibility of stages.

Some evidence hints at a cyclic character in the theoretical points described, the former affecting the latter and vice-versa. In this sense the perceptual process is viewed as a sensory-behavioral loop. For instance:

> A child with a given readiness has an experience in an environment from which he selects what is meaningful and integrates it into his past experience according to his cognitive style and personal-cultural habits. From this assimilation he evolves a response--a perceptual image, a concept or both--from which he delineates an expression in words or in art; he may have an aesthetic reaction which is an internalized delineation of form and impact. Each experience he has, when carried through to a delineation of his responses, changes his readiness for the next related experience. It modifies his subsequent information handling and problem-solving abilities and gives him a broader basis for being creative. (McFee, 1970, p. 264)

While McFee cites perceptual tendencies which may be inherited, and discusses the perceptual differentiation process, her viewpoint differs from the previously discussed theories in several ways. This theory is synthesized largely from the research findings of several disciplines including art, psychology, anthropology, education, and social science. By emphasizing the interaction of culture, environment and individual differences, McFee holds that perception is largely learned. Additionally, while the P-D-L viewpoint has been somewhat modified and expanded with additional research over several years, she also recognizes and calls for additional research verification.

McFee's viewpoint is interdisciplinary in that it is partially drawn from sources beyond art. A deliberate operational attempt was made to select child oriented data which appeared related to art behavior and which amplified awareness of the potential range of individual differences involved in responding to visual art. Studies relating to early childhood experiences in the environment were given particular attention. In this regard, the perception-delineation theory is a reaction to the limitations of some previous notions. The position is selective since what was felt to be pertinent data was extracted at the possible expense of conflicting information, a not uncommon practice among educational theorists. McFee does cite several prior theories concerning perceptual development in art, however.

The data on which the theory is based is also primarily investigative and not experimentally based, so being ex post facto in character it does not tend to isolate or explore causal factors for what was observed. To develop the theoretical connections, McFee must therefore infer beyond the information given. For that reason, experimental studies of verification and correlational efforts would be a useful addition.

An eclectic methodology of this type may attempt at consistency, but also results in a broad viewpoint that tends to be ambiguous at times. Point by point the theoretical development displays considerable overlap. Readiness is a salient factor in each of the first five points, for instance, suggesting that a potentially different format or frame of reference might elucidate the system. A case may also be made for the position that this expanded notion of perceptual data processing tends to confuse or ignore what is learned in perceptual learning; a problem

which McFee apparently recognizes but attacks with generalities in the form of concepts, goals and objectives. Differentiation is a concept. Concepts are generalities. Assuming that similarity, proximity, closure and the like are principles of perceptual organization, as McFee does, the question of what is learned remains. Does one learn contrasts, relations, patterns, or something else? If learned distinctions among visual stimuli are made, then categorized into class concepts, what is learned is something beyond concepts. When objects moving in time and space are observed, surely something more than mental images are learned (McFee, pp. 251-254). In a theory of perceptual learning, one would hope for a concise schematic rendering of conceptual/perceptual skills describing discrimination learning around which content could be developed. Perceptual differentiation consists largely of increased discrimination of visual data. This subject is somewhat lacking and may be a primary reason for the urging of research verification and investigation of causal factors affecting art learning. In this regard also, McFee is unique among the theorists previously critiqued.

An interesting aspect of the perception-delineation theory is that it appears future-oriented, concerned with what learning and teaching may yet accomplish. The general contribution of the P-D-L theory for art education, however, is the assertion of environmental, cultural and learning effects on perceptual responding in art. In this view, the teacher is seen as a pervasive and positive influence. A basic technique in the theoretical development was the deliberate seeking of relationships and causal factors explicated by research. Inductive logic is applied here, as in previous theories, but the projective notions in this case are complimented with recognition that more experimental research is required. The perception-

delineation theory, therefore, is apparently not viewed as a closed issue. Research verification of the operational definitions and theoretical structure used therein may eventually be realized, but at present the P-D-L viewpoint is best described as comprehensive, open to question, and yet illuminating. Theoretical development of perceptual learning in art will be served by this base, but will also need to pay attention to what is learned and the ordering of learning principles.

A Psychologist's Viewpoint of Perceptual Learning and Development

More complete theories of perceptual learning processes exist, necessarily, in the field of perceptual psychology. One of the more interesting and potentially useful of these viewpoints for art education is Gibson's (1969) notion of stimulus oriented perceptual differentiation. This research based differentiation theory attends to the development of children's perception, learning to function in space and to the perception of representations.

Perception, from this standpoint, is the process by which we obtain firsthand information about the world around us. It has a phenomenal aspect (the awareness of events presently occurring in our immediate surroundings), and a responsive aspect (entailing discriminative, selective response to stimuli in the immediate environment).

Perceptual learning refers to an increase in the ability to extract information from the environment, as a result of experience and practice with stimulation coming from it. This change seems to be in the direction of getting better information, since man has

evolved in the world and constantly interacts with it. Learned differentiation begins at a very early age and becomes more selective and economical with maturity.

Three processes are held to be basic for perceptual differentiation. Gibson refers to them as the mechanics of perception: (1) abstraction of different properties in perceived stimuli, (2) filtering out of irrelevant variables unnecessary to the task at hand, and (3) selective attention, such as exploratory activity of sense organs.

Perceptual search appears to be activated or motivated by several factors, all of which serve to direct the individual's attention. In this area, Gibson identifies and defines personal attitude, task, cognitive motivation, autistic factors and cultural bias as affectors of perceptual learning.

Given variables which seem to motivate visual perception, what is learned in perceptual learning? The criterion for perceptual learning is specificity, the internal reduction of uncertainty. The products of the search have the property of reducing the information to be processed. Perception is thus active, adaptive, and self-regulated. What is learned appears to be: (1) patterns, as in transformations of melody, the pattern same, but the notes different, (2) properties, or the dimensions of difference, and (3) distinctive features, such as relations, values and contrasts. The learning of invariants (the ratios and proportions which do not change even though an object may move, or an event may occur over time and space) is held to be a primary factor in the perception of events which appear to undergo transformation.

Operating from this base, Gibson outlines six propositions as principles underlying learning in perception. Each of these notions seem important where visual/cognitive enterprises such as art are undertaken, In learning to discriminate form in multi-dimensional learning tasks:

1. Emphasize the dimensions of difference between members of a set of stimuli.
2. Learning distinctive features facilitates learning.
3. Learning of differences is facilitated by providing graded examples of contrasts so as to define and isolate the critical variable with gradual changes.

In predicting discrinimation performance, assuming previous learning of distinctive features has taken place, Gibson offers experimental evidence indicating that:

4. Discrimination is best when feature differences are maximal (Yonas and Gibson, 1967).
5. Discrimination is best when distinctive features are enhanced in a stimulus display (Ryan and Swartz, 1956).
6. New stimuli in a class of objects with familiar distinctive features should be more easily discriminated from one another than an equivalent set without familiar distinctive features (Gibson, 1963).

Perception, then, is seen as an active differentiation process in which the organism searches for, and extracts information from the available stimulation that has not already been detected and utilized. This process may proceed as a system in ordered arrangement, a hierarchy, such as: (1) discrimination, at first we distinguish the differences between two sets of stimuli, (2) recognition, we begin to recognize the correct stimuli on successive tasks as being the original stimuli, and (3) production, being able to reproduce stimuli.

Visual perception, from this standpoint, may be seen as a high level cognitive enterprise, structured and controlled in an important way by sensory experiences with the environment. Productive and perceptual learning efforts in art seem closely related to the theoretical dimensions cited by Gibson. The learning and production of sensory arrangements could also be one of the most important undertakings for education in general. Some research evidence indicates that without such experiences, learning may be severely deprived, and may not occur at all (Held and Hein, 1963).

Curriculum and specific lesson content in the visual productive art processes could be developed utilizing the above notions of the mechanics of perception, sensitivity to factors governing perceptual search, attention to what is learned in perceptual learning, and emphasizing the distinctive features present in art forms, materials and the visual environment. Increased sensitivity to environmental variety and increased differential response might hold rewards for increased aesthetic and creative productivity.

Epilogue

Lowenfeld then, has suggested that perceptual ability is biogenic, inherent in the organism, and that learning is best left to natural means. Arnheim, operating from a similar naturalistic viewpoint, has emphasized increased differentiation as a correlate of maturation. McFee has viewed environment as a causal factor for increased perceptual modification and suggests that perceptual learning in art is a continually changing sensory-behavioral system. In each

case, and properly, inference is a primary theoretical mechanism, but additional experimental research is required to systematically delineate cause and effect. While some attention has been given to response styles in artistic perceiving, little is known concerning the learning modes affecting perceptual response through art. For research, more usable theoretical constructs are to be found in the field of perceptual psychology.

In addition to the foregoing, three additional general criticisms may be made. Initially, as in most traditional learning prototypes, the existance of prior capabilities is slighted or ignored in most of these theoretical descriptions. Secondly, the assessment of primary capabilities which may play a sequential role in determining subsequent learning has been largely ignored by art theorists interested in the subject of perceptual performance. Thirdly, the presence of a performance does not make it possible to conclude that learning has occurred. It is necessary to show that there has been a change in performance. Further, the possibility exists that many varieties of perceptual learning in art may exist which may eventually become delineated by describing the necessary factors comprising learning conditions.

Nevertheless, learning variables relevant for experimental study of perceptual performance in art would seem to be: (1) assessment of what capabilities play a part in determing subsequent learning, (2) evaluation of the initial capabilities of the learner, and (3) determining the stimulus conditions for learning existing outside the learner.

Examination of theoretical constructs relevant to these general problems of learning theory may hold fruitful direction for continuance and verification of the preliminary theoretical positions discussed here. The major issue, however, remains that of refining the theoretical basis of operations relevant to perception in the visual arts.

Over time, theories of perceptual learning relevant to art education appear to be evolving from simplistic notions describing children's art endeavors to comprehensive viewpoints which consider the variety of factors which may affect perceptual growth. No complete theory of perceptual learning presently exists in art education, or for that matter, perceptual psychology. Increasing attention, however, is rightly being paid to data from other disciplines, but there is some risk involved, since the data may not directly apply to art efforts. This generalized research knowledge may aid in establishing conditions for learning, or how to begin, but how to continue at higher levels of human performance such as invention or creativity remains clouded. Similarly, aspects of personal interaction between the teacher and student, such as motivation, persuasion, or establishing attitudes and values remains problematic.

Despite the relative infancy of serious research in the field of art, there is encouragement from the standpoint that contemporary experimental research in art education has already tended to lend credence to some of the general parameters discussed above.

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